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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,723	07/10/2003	Noh Yeal Kwak	29936/39431	2625

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MARSHALL, GERSTEIN & BORUN LLP
6300 SEARS TOWER
233 S. WACKER DRIVE
CHICAGO, IL 60606

EXAMINER

KEBEDE, BROOK

ART UNIT PAPER NUMBER

2823

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,723

Applicant(s)

KWAK, NOH YEAL

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 6-10 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5 is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species I (i.e., Claims 1-5) in the reply filed on October 25, 2004 is acknowledged.
2. Claims 6-10 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 25, 2004.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "forming a triple well on the semiconductor substrate," as recited in claim 1, line 4, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 1 and 5 objected to because of the following informalities:

Claim 1 recites the limitation "implanting an ion for adjusting **the threshold** voltage into the semiconductor substrate" in lines 7-8. However, the recited limitations lacks proper antecedent basis. The examiner respectfully suggests changing "the threshold voltage" to --a threshold voltage--.

Claim 5 recites the limitation "wherein the sacrificial oxide film is removed by cleaning process **us** DHF (50:1) + SC-1(NH₄OH/H₂O₂/H₂O)" in lines 1-3. However, the phrase "us" seems a typo. The examiner respectfully suggests changing "us" to --using--. Appropriate correction is required.

Allowable Subject Matter

6. Claims 1-5 are allowed over prior art of record.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither anticipates nor renders obvious the claimed subject matter of the instant application as a whole either taken alone or in combination, in particular, prior art of record does not teach "implanting an inert ion into the semiconductor substrate, by a given

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depth to form an anti-diffusion layer; implanting an ion for adjusting the threshold voltage into the semiconductor substrate on the anti-diffusion layer,” as recited in claim 1.

Claims 2-5 are also allowed as being dependent of the allowed independent base claim.

Re claim 1, Dong et al. (US/2004/0106256) disclose forming a sacrificial oxide layer on a semiconductor substrate and implanting the substrate to form a well region, after formation of the well region in the substrate, an ion implantation performed in order to adjust the threshold voltage, after the threshold voltage adjustment process, the sacrificial oxide layer is removed using the well-known cleaning process, thereafter removal of the sacrificial layer, a tunnel oxide, a polysilicon layer and a pad nitride layer sequentially formed and then patterning process performed to form shallow trench isolation in the substrate using the patterned pad nitride layer as a mask. However, Dong et al. fail to disclose “implanting an inert ion into the semiconductor substrate, by a given depth to form an anti-diffusion layer; implanting an ion for adjusting the threshold voltage into the semiconductor substrate on the anti-diffusion layer,” as recited in claim 1.

Lin et al. (US/6,297,082) also disclose forming triple wells in the semiconductor substrate and heavy ion implantation process to form anti-punchthrough (APT) region in the semiconductor substrate and threshold voltage implantation process performed. However, Lin et al. do not specifically disclose “implanting an ion for adjusting the threshold voltage into the semiconductor substrate on the anti-diffusion layer.”

In addition, the combination of Dong et al. and Lin et al. does not render the claim obvious because the Dong et al. disclosure is directed to manufacturing of a flash memory

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whereas the Lin et al. disclosure directed to MOS transistor and there will be no motivation to combine the flash memory and MOS transistor.

Conclusion

8. This application is in condition for allowance except for the following formal matters:

The formal matters that set forth in Paragraphs 4 and 5 above should be addressed by applicants prior pass the instant application to issue.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Correspondence

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (571) 272-1862. The examiner can normally be reached on 8-5 Monday to Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BK

January 9, 2005


George Fourson
Primary Examiner